BIRCH CREEK RESERVOIR #2

Introduction

Birch Creek Reservoir #2 is an intermediate sized reservoir on the east slope of the Monte Cristo Range. It provides some summer recreational opportunities, and has a much smaller sister reservoir, Birch Creek Reservoir #1, about 1/2 mile downstream.

Birch Creek Reservoir #2 was created in 1951 by the construction of an earth-fill dam on Birch Creek. The reservoir shoreline ownership is evenly divided between the BLM and private concerns. Public access is unrestricted. Most of the water is drained for irrigation needs by midsummer, but a 400 acre foot conservation pool ensures that water can be used for recreation and coldwater aquatic habitat as well. There are no foreseeable changes in water usage at this time.

Characteristics and Morphometry

Lake elevation (meters / feet)	2,108 / 6,915
Surface area (hectares / acres)	25 / 63
Watershed area (hectares / acres)	4,406 / 10,880
Volume (m^3 / acre-feet)	
capacity	2.783×10^6 / 2,256
conservation pool	493,400 / 400
Annual inflow (m^3 / acre-feet)	
Retention time (years)	<1
Drawdown (m^3 / acre-feet)	2.259×10^6 / 1831
Depth (meters / feet)	
maximum	25 / 81
mean	11 / 35
Length (meters / feet)	1,263 / 4,137
Width (meters / feet)	262 / 859
Shoreline (km / miles)	3.3 / 2.05

Location

County	Rich
Longitude / Latitude	111° 19' 45" / 41° 30' 23"
USGS Map	Birch Creek Reservoirs, UT 1969
DeLorme's Utah Atlas & Gazetteer™	Page 61, B-5
Cataloging Unit	Bear River (16010101)

Recreation

Birch Creek Reservoir #2 is easily accessible from U-39. The turnoff is about 36 miles east of Huntsville, exactly

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two miles west of the Woodruff Creek Reservoirs turnoff, and 8 miles west of Woodruff. Turn north and follow the gravel road to the northwest up Birch Creek about one mile to the reservoirs. Reservoir #2 is upstream from reservoir #1. The turnoff is poorly marked, but with a good map the road is not difficult to find.

Fishing is the primary recreational use of the reservoir. There is a picnic area with primitive toilets between the two reservoirs, and it is possible, but not easy, to get a boat on reservoir #2. By midsummer the reservoir is drained down to the conservation pool (about 25 feet deep) exposing 35 vertical feet of muddy banks.

Monte Cristo Campground, a USFS facility, is about 13 miles west of the Birch Creek turnoff on U-39. It is open from June through September, and has 53 tent sites, picnic areas, and primitive toilets. Fees are charged for campground use.

Watershed Description

The Little Bear River is eroding the west slopes of the Monte Cristo Range at a rate relatively faster than Birch Creek erodes the east slopes. Both sides of the ridge are dissected by deep canyons, but the canyons to the west are much deeper, indicating that their headwaters are slowly capturing drainage from the east side of the ridge. Birch Creek drains the east slopes, and the reservoir is built about halfway from the headwaters to where Birch Creek (after joining Woodruff Creek) joins the Bear River in the town of Woodruff. Slopes surrounding the reservoir are quite steep (60%). The reservoir is an impoundment of the narrow, "V" shaped canyon with sage-grass vegetation.

The watershed high point, Eccles Peak, is 2,768 m (9,062 ft) above sea level, thereby developing a complex slope of 6.1% to the reservoir. The average stream gradient of Little Brush Creek is 2.8% (147 feet per mile) The inflow and outflow is Birch Creek.

The watershed is made up of mountains and terraces. The soil is derived from the Wasatch Formation, the limestone bedrock that underlies much of the watershed. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities consist of sage-grass, spruce-fir and aspen. The watershed receives 41 - 102 cm (16 - 40 inches) of precipitation annually. The frost-free season around the reservoir is 80 - 120 days per year.

Land use in the watershed is 100% multiple use and native grazing. Minor recreational use takes place.

Limnological Assessment

The water quality of Birch Creek Reservoir #2 is to be good. It considered to be hard with a hardness concentration range of 166-183 mg/L (CaCO3). The only parameters monitored exceeding State standards for defined beneficial uses of the reservoir is phosphorus.

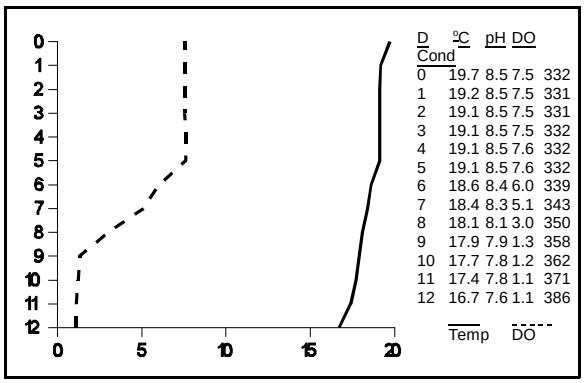
Limnological Data

Data sampled from STORET site: 590713

Surface Data	1981	1989*	1991
Trophic Status	M	H	M
Chlorophyll TSI	-	75.16	51.06
Secchi Depth TSI	-	-	44.17
Phosphorous TSI	47.34	66.59	46.97
Average TSI	47.34	70.88	47.40
Chlorophyll a (ug/L)	-	93.9	8.05
Transparency (m)	-	-	3.0
Total Phosphorous (ug/L)	20	76	20
pH	8.5	8.70	8.50
Total Susp. Solids (mg/L)	5.0	-	<3.0
Total Volatile Solids (mg/L)	-	-	2
Total Residual Solids (mg/L)	-	-	<3
Temperature (°C / °f)	18/64	19/66	18/65
Conductivity (umhos.cm)	388	280	333
Water Column Data			
Ammonia (mg/L)	0.05	<0.05	0.06
Nitrate/Nitrite (mg/L)	0.19	<0.01	0.02
Hardness (mg/L)	172	-	167
Alkalinity (mg/L)	180	-	158
Silica (mg/l)	-	-	5.9
Total Phosphorus (ug/L)	20	76	28.7
Miscellaneous Data			
DO (Mg/l) at 75% depth	-	8.0	1.3
Stratification (m)	-	NO	NO
Limiting Nutrient	P	N	N
Depth at Deepest Site (m)	-	5.7	12

* Period 2 Data Only

Nutrient levels are considered low for 1991, however, phosphorus concentrations in 1981 and 1989 both exceeded the recommended pollution indicator value of 0.25 mg/L. The reservoir is considered to be nitrogen limited with low nitrogen/phosphorus ratios. The reservoir in recent years has not been filled to capacity and may be a major factor for elevated phosphorus levels. Although the reservoir had an average TSI value of 70.88 for 1989, the reservoir is classified as a mesotrophic system consistent with data obtained in 1981 and 1991. TSI values for those time periods is relatively stable at approximately 47. Recent conditions show that the reservoir has not stratified. However, if the reservoir was operated nearer capacity the reservoir might be expected to stratify. Even without stratification the reservoir shows



D	°C	pH	DO	Cond
0	19.7	8.5	7.5	332
1	19.2	8.5	7.5	331
2	19.1	8.5	7.5	331
3	19.1	8.5	7.5	332
4	19.1	8.5	7.6	332
5	19.1	8.5	7.6	332
6	18.6	8.4	6.0	339
7	18.4	8.3	5.1	343
8	18.1	8.1	3.0	350
9	17.9	7.9	1.3	358
10	17.7	7.8	1.2	362
11	17.4	7.8	1.1	371
12	16.7	7.6	1.1	386

a significant loss of dissolved oxygen downward in the water column. The dissolved oxygen concentration falls below the standard for a cold water fishery (6.5 mg/L) at 6 meters. Below 8 the concentration of dissolved oxygen approaches an anoxic state. According to DWR stocking records Birch Creek Reservoir #2 has been stocked with 30,000 fingerling rainbow trout (*Oncorhynchus mykiss*) annually. In addition some cutthroat trout (*Oncorhynchus clarki*) are present in the reservoir. Emergent macrophytes are very limited in the reservoir.

The reservoir has not been chemically treated by the DWR, so populations of native fishes could still be present in the reservoir

Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume (mm^3/liter)	% Density By Volume
Aphanizomenon flos-aquae	11.092	80.46
Sphaerocystis schroeteri	2.641	19.16
Oocystis borgei	0.022	0.16
Wislouchiella planktonica	0.020	0.15
Pennate diatoms	0.010	0.07
Total	13.785	
Shannon-Weaver [H']	0.52	
Species Evenness	0.32	
Species Richness	0.17	

As observed, the reservoir is predominately populated by blue-green algae indicative of eutrophic conditions.

Pollution Assessment

Nonpoint pollution sources include the following: Sedimentation and nutrient loading from grazing, and litter, human waste and chemicals from recreation.

Grazing takes place throughout the watershed and along the reservoir shoreline.

There are no point sources of pollution in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

Information

Management Agencies	
Bear River Association of Governments	752-7242
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Bureau of Land Management	539-4001
Bear River Resource Area	977-4300
Recreation	
Bridgerland Travel Region (Logan)	657-5353
Garden City Chamber of Commerce	946-2901
Reservoir Administrators	
Wes Tingey	793-4229
Woodruff Reservoir and Irrigation Company	
PO Box 520, Woodruff, UT 84086	